ABSTRACT

The present invention provides a method for discriminating between detected radiation events, so that the sensitivity of the radiation detector may be preserved without causing the inclusion of a large number of the undesired radiation events. This method includes the steps of: (1) empirically determining the energy response function of the radiation detector; and (2) then using the energy response function during the actual detection process to differentiate between the desired and undesired radiation events. Generally, the energy response function for each of the detectors is determined by simulating the condition for the subsequent, actual measurement. During this process, the detector is illuminated with a uniform stream of radiation to be measured. The detector should be exposed to a large number of radiation rays, and the number of undesired rays is minimized. For example, the detector will be exposed to only direct, unscattered radiation. This simulation produces an energy response function for the detector in conditions that approximate the actual measurement. Then, when taking actual measurements in the second step, a least squares estimate of the number of desired, unscattered events is produced by taking the dot product of (1) the spectrum acquired during actual measurement and (2) a weighting vector determined from the empirically determined energy response function.